



Forest Health Protection Pacific Southwest Region



Date: June 17, 2011

To: Richard Elias, Assistant US Attorney

Subject: United States v. Pacific Gas and Electric Company, et al., Case No. 2:09-CV-02811-GEB-EFB. (FHP Report No. N11-04)

Introduction

I have been requested by the US Attorney's office to provide an opinion on the condition of the Douglas-fir tree that is alleged to have caused the Sims Fire on July 27, 2004. Dave Schultz' and my opinions were summarized in our joint report to Patrick Brown and Larry Dodds made shortly after the fire (USDA Forest Service, Forest Health Protection Report No. N04-07, issued on August 4, 2004), corrected by my letter to Patrick Brown on February 8, 2011 (FHP Report No. N-11-03). I incorporate those reports by reference (Exhibit A). In addition to what is contained in that report, I have the following observations and opinions that are discussed below.

Qualifications

A detailed summary of my educational background and work experience in hazard tree evaluation and management is attached (Exhibit B). I have a Bachelors Degree in Biology from Colgate University (1978), and Masters and Ph.D. Degrees in Botany and Plant Pathology (concentrating in Forest Pathology) from Oregon State University (1985 and 1989), and have served as a Plant Pathologist for the Forest Health Protection unit of the USDA Forest Service in Gunnison, Colorado and Redding, California for the last 22 years (1989-present). I've conducted a wide variety of disease, insect and hazard tree evaluations in a variety of situations, including evaluations of failed trees that were alleged to have started wildfires. I've received and given training in hazard tree inspection, identification and evaluation in multiple contexts, and as chair of the Hazard Tree Committee of the Western International Forest Disease Work Conference, I organize a major workshop for trainers from throughout the US every three years. In addition to the qualifications relative to hazard trees that are listed in Exhibit B, I have extensive experience and expertise relative to a wide range of topics in Forest Pathology and Forest Health Management.

In the last four years, I have testified in deposition as an expert witness related to the cause of a tree failure that was alleged to have caused the Grass Valley Fire on the San Bernardino National Forest, see U.S. v. SCE, et al., Case No. CV 09-2597 VBF (CTx).

Observations

On February 9, 2011, I revisited the Sims Fire site. Overall, the examinations that I made that day reconfirmed the observations and conclusions that Dave Schultz and I reported on in 2004. Although some aging had occurred over the last 6½ years, the major features of the subject tree remained largely intact. The smaller Douglas-fir that was next to the subject tree had been cut, but the stump remained. Remeasurement of the diameter of the bole stob of the subject tree reconfirmed that the subject tree was 48 inches in diameter at breast height (DBH). We also examined the 68-foot, 6-inch-long section of the subject tree that had the top (distal) end in Grouse Creek and the bottom (proximal) end just below FS Highway 6. I measured the diameter of the piece five feet from the proximal end. Because this end of the piece contained only part of the circumference, the intact half of the circumference was measured, then doubled to give the diameter of the entire tree at that point. The total diameter was 30 inches. Because the distal end of the tree piece was immersed in the creek, it was not possible to examine or remeasure that end of the piece. However, in 2004, the diameter at that end measured 26 inches.

Opinions

1. As stated above, the overall observations and conclusions that were made by Dave Schultz and me remain unchanged. The subject tree had extensive basal decay prior to its failure and the ignition of the Sims Fire. A likely point of entry for the decay fungus was a large fire scar on the uphill side of the base of the tree. When the tree failed, it hit the power line. When it hit the ground, parts of the tree at both the distal and proximal ends of the falling tree broke off, and a 68-foot, 6-inch long section slid down the hill, coming to rest in Grouse Creek. Because decay fungi tend to spread relatively slowly, it is my opinion that the tree had been extensively decayed to the point of having an unacceptably high potential for failure for at least 20 or more years prior to the falling of the tree. The high hazard potential of this tree was therefore missed over multiple power line inspection cycles.
2. I've reviewed the report from Phil Eisenhauer (Forest Silviculturist, Shasta-Trinity National Forest), in which he states that fully intact, the subject tree would likely have been between 156 and 166-feet tall. I have been informed that LiDAR measurements, together with the fact that only the south phase wire appears to have been struck by the tree, indicate that the height of the tree between the break and the top must have been between 91 and 104-feet (not including the height of the stob that remained after the failure). It is therefore a reasonable conclusion that the tree had a broken top prior to the incident. Douglas-firs with broken tops are not uncommon in the area. Trees with broken tops, if they are within striking distance of a target, should be fully evaluated in the same way as an intact tree. In Schultz' and my 2004 evaluation, the pieces that we were able to recover and examine only account for 77 total feet of tree height (including the bole stob) and 68-feet-6 inches of length above the break. However, since the break at the distal portion of the long piece that was resting in Grouse Creek was fresh, it was our opinion that there must have been an additional top section of the tree that snapped off when the tree fell that we were unable to find. It is also possible that portions of the tree between the break at the top of the bole stob and the bottom of the long piece were lost in the fire or not located as well.
3. I've also reviewed the deposition of Ron Middleton (given on April 21, 2011), who performed inspection work for Western Environmental Consultants, Inc. along the power line in order to identify hazard trees that could hit the line. I also reviewed the

2001 Edition of the Power Line Fire Prevention Field Guide, which was in effect at the time of the inspections. It appears to me that the inspections that were performed were inadequate for the following reasons:

- a. Mr. Middleton inspected approximately 550 miles of line per year. That is far too much for anyone to adequately and completely cover, particularly when the view many of the trees are obscured by brush and other trees.
- b. Mr. Middleton performed this large amount of inspection alone. As discussed on page 1-13 of the Power Pine Fire Prevention Field Guide, a two-person team is more efficient, and would have allowed the inspectors to more completely inspect potential hazard trees.
- c. It appears that Mr. Middleton did not fully appreciate the importance of completely inspecting for defect all trees that are tall enough to strike the power lines (to the maximum potential distance of displacement of the conductors, as illustrated on page 1-38 of the Field Guide), or simply did not have the time or resources to do so. At several points in the deposition, Mr. Middleton stated that he did not perform a full examination of every tree that could potentially hit the line. Page 1-22 of the Field Guide discusses the need to make frequent side trips outside of the cleared right-of-way in order to fully evaluate potentially defective trees within striking distance of the line, particularly in coniferous stands. If Mr. Middleton had looked at all sides of the subject tree, he would have easily seen the large exposed basal fire scar and its associated decay, and would have likely marked it for removal.
- d. Mr. Middleton did not have all of the tools necessary to assess decay, including an axe, night stick, or other implement to "sound" a tree for decay, and an increment borer or portable drill to assess the amount of decay and solid wood in potentially defective trees. The importance of using these tools is referred to on pages 1-18 and 1-22 of the Field Guide. Although not specifically mentioned in the Field Guide, an axe, knife, pulaski or other cutting implement can also be helpful in locating and assessing tree decay. He stated that he had never used an increment borer (page 34 of the deposition), and although it was not specifically stated, the only tools he appeared to have at his disposal were his fingernails, a stick and a pocket knife (page 25 of the deposition).

Mr. Middleton indicated that he was aware of the importance of wounds, cat faces and scars as potential entry points for decay fungi and as indicators of decay (both visible and hidden), as is discussed on pages 1-18 and 1-19 of the Field Guide. However, he did not appear to fully appreciate the importance of always checking trees with these indicators for relative amounts of decay and sound wood. Again, he simply may not have had the time or resources.

Again, if Mr. Middleton had seen the fire scar at the base of the subject tree and had assessed the extent of the decay with the proper equipment, he would have readily detected the extensive internal decay, and would have marked the tree for removal.

- e. In Dave Schultz' and my report from 2004, we also reported on an intact Douglas-fir that was present immediately next to the subject tree. The tree had a

3-foot, 1-inch-long fire scar at the base, 11-inches above the ground line. The wood under the scar was decayed, and pieces of the decay fractured into cubes typical of a cubical brown rot. In addition, three “conks” (fruiting bodies) of *Phellinus pini*, a white trunk decay fungus that is common in older Douglas-fir, were noted 20-30-feet up the bole. I’ve recently been informed that this adjacent tree had a diameter at breast height (DBH) of 39-inches and was approximately 100-feet tall. This tree was therefore also within striking distance of the power line and should have been inspected fully. If Mr. Middleton had fully inspected this tree, he would have seen the conks and would have had to come closer to the tree. In doing so, he would have easily seen the large basal scar on the nearby subject tree and would have been obliged to investigate that one more fully as well. Mr. Middleton agreed with this point in his deposition (page 36).

Conclusions

As stated above, except for a few minor details, the observations and conclusions that were made by Dave Schultz and me in 2004 remain the same. Information that has been gathered since that time may have refined a few things, but overall, the added information has only confirmed and reinforced those observations and conclusions.

Even though the subject tree was within striking distance of the power line (or else it would not have hit the line), it appears that it was not fully or properly assessed for defect or hazard potential. In addition, the Douglas-fir with conks that was immediately next to the subject tree and was also within striking distance of the power line should also have drawn the inspector closer to the subject tree. If the inspector had come closer, the large fire scar on the subject tree would have easily been seen. In any case, if the subject tree had been thoroughly and properly inspected prior to the failure, it would have easily received a high hazard rating, based on the amount of readily detectable bole decay and the height of the tree relative to the power line. It would have been an obvious candidate for removal. It also appears that the high hazard potential of this tree was missed for at least twenty years or more.

Materials Relied Upon

1. Site inspection, August 2, 2004 visit to the Sims Fire site
2. FHP Report No. N04-07, Assessment of Douglas-fir failure at Sims Fire Ignition site
3. FHP Report No. N11-03, Feb. 8, 2011 letter to Patrick Brown
4. Site inspection, February 9, 2011 visit to the Sims Fire site
5. Expert report from Phil Eisenhauer
6. Deposition of Ron Middleton, April 21, 2011
7. Rough draft depositions of Gene Stotts and Ryan Brockbank (I have received but have not had sufficient time to review these documents. I reserve the right to offer opinions on matters covered in their depositions once reviewed.)
8. Power Line Fire Prevention Field Guide, 2001 Edition

/s/ Pete Angwin

Dr. Pete Angwin
Plant Pathologist
Northern CA Shared Service Area